The arms were measured from the mouth, but the arm-measurements must be considered only approximate, as, with the exception of the first and third arms on the left, the extreme tips are missing.

XLIX.—*On the Geographical Races of the Lesser Horseshoe Bat* (Rhinolophus hipposiderus). By Knud Andersen.

In a paper published two years ago in the 'Proceedings of the Zoological Society of London' (1905, ii. pp. 139–144) I pointed out the existence of three geographical races of the Lesser Horseshoe Bat, viz. a small southern form (*Rh. h. minimus*), distributed, broadly speaking, over the Mediterranean Subregion, south-eastwards to Sennaar and Keren; a large northern form (*Rh. h. hipposiderus*), ranging, broadly speaking, from the extreme N.W. Himalayas (Gilgit), through N.W. Persia and Armenia, over the whole of Central Europe N. of the Balkans and the Alps; thirdly, a form (*Rh. h. minutus*) apparently confined to England, Wales, and Ireland. The southern differs from the northern form, I wrote, in being in every respect smaller—in some respects, as it seems, absolutely smaller, in others at least on an average; I found the length of the forearm to be the most convenient means for a ready discrimination: in *minimus* 34·7–38 mm., in *hipposiderus* 39–41·7. As to the characters of the English form, they have no bearing on the subject-matter of this paper, and are therefore left entirely out of consideration here. My conclusions were based on an examination of ninety-five adult specimens, mostly from the collection of the British Museum, and obtained in localities dotted over practically the whole area occupied by the species.

Since I wrote that paper several other specimens, partly material added to the British Museum collection, partly examples sent for inspection and identification by correspondents here and abroad, have passed through my hands. Every specimen has agreed precisely with the characters pointed out by me, with the exception of three, *all of which are from a place in which I had already predicted* that both forms or intermediate individuals would most probably be found.*

* "I have some reason to believe that in certain border districts (*e. g.* S.W. Switzerland . . . .) the two forms occur together, perhaps side by side, but intermediate examples I have never seen. They will probably be found." (Proc. Zool. Soc. 1905, ii. p. 141.)

In the 'Mémoires de la Société zoologique de France' (1907, pp. 21–22) M. Charles Mottaz, Geneva, records the results of an examination of 169 specimens of the Lesser Horseshoe (presumably obtained at or near the place where he lives or somewhere else in Switzerland, though this is not stated in his paper) as follows :—"Jusqu'ici le résultat de cette étude nous laisse perplexe et ne saurait nous convaincre de la validité de la sous-espèce *minimus*. En effet, sur 169 sujets actuellement entre nos mains, mesurés et scrupuleusement étudiés, nous avons dû constater que: 1°. Ceux qui répondaient aux caractères du *minimus* ou qui pouvait être taxés d'intermédiaires étaient tous, jeunes [*sic*] et vieux, des ♂. 2°. Ceux qui furent classés *hipposideros* étaient tous, jeunes [*sic*] et vieux, des ♀. Que conclure? Y a-t-il coincidence fortuite, ou plutôt la différence signalée serait-elle seulement une question de sexe? . . . . Pour l'instant nous ne saurions enregistrer définitivement le *Rh. hipposideros minimus* dans notre faune suisse ni admettre la validité de cette sous-espèce tout au moins pour ce qui concerne les représentants de notre région."—In a few words: M. Mottaz has come to the conclusion that what I have taken to be a difference between a southern and northern form of this bat is, in reality, at least in Switzerland, a sexual difference only.

Although it must be granted, I think, that in committing a mistake of such kind as suggested by M. Mottaz I should have made myself guilty of an almost unthinkable carelessness (a quality of which, I hope, my zoological papers do not in other respects bear too abundant witness), and at the same time been singularly unfortunate in having had before me from the whole area inhabited by *minimus* males only, and from the whole area of *hipposiderus* females only; although M. Mottaz, in dealing with a question of *size* in a series of individuals, does not give any measurements at all to enable the reader to control the correctness of his results; although M. Mottaz, in discussing a question for the decision of which it is of the highest importance to know the exact places in which he obtained the individuals examined, does not give a single locality (they were "recueilli . . . . partout," is the only information given, so that it cannot even be seen with certainty whether they were obtained "partout" in Switzerland or "partout" in Europe generally); although, therefore, his two "conclusions," as given in his paper, are merely postulates not supported by a single fact or figure; although the insertion of the word "jeunes" in both of his conclusions admits of one explanation only, viz. that M. Mottaz lacks the necessary training in dealing with questions of this

kind (for, inasmuch as the difference between *minimus* and *hipposiderus* is a well-marked but small difference of *size*, nobody would, of course, be able to tell whether a *young* individual, obtained in a region where we have all reason to believe that *both forms* occur, is referable to the one rather than to the other form),—I shall now, in the interests of the subject, challenge his conclusions and prove, by means of indisputable figures and facts, that M. Mottaz's result, strange as it is, is totally wrong as well. Strictly speaking I cannot, of course, prove anything about the very specimens examined by M. Mottaz, and which I have not seen, but this is also not necessary; if only I succeed in proving, on the basis of the large British Museum series, the validity of the characters of *minimus* and *hipposiderus*, and their perfect independence of the sex of the individuals, then M. Mottaz will get nobody to believe that what in southern as compared with northern specimens of the Lesser Horseshoe is a well-marked *racial* difference, is in Switzerland transformed into a *sexual* difference.

Subjoined I give the locality, sex, and length of forearm of all the full-grown examples of *minimus* and *hipposiderus* which I have had the opportunity of examining up to this moment. Be it noted that the measurement of the forearm has been taken from the most backward projecting point of the forearm to the *front curve of the carpus* (wing folded). All the measurements are of perfectly adult specimens, with one exception, mentioned below.

Rh. h. minimus.

Erythrea: Keren.—One male, young adult, type of *Rh. minimus*, Heuglin: 36·3 mm. (The not quite consolidated condition of the finger-joints of this individual proves it to be slightly immature; it is, however, in all probability full-grown; I give the measurement here only because this example is the type specimen.)
Sennaar.—One female: 36·5.
Cyprus.—Five males: 34·7, 35·8, 36·0, 36·8, 37·2; one female: 37·7.
Smyrna.—One female: 37·5.
Crete.—One male: 35·5.
Malta.—Four males: 36·0, 36·2, 36·3, 36·9; two females: 36·0, 36·0; two unsexed: 36·0, 37·0.
Sicily: Ficuzza.—One male: 35·7; four females: 36·2, 36·2, 36·8, 36·8.
Middle Italy: Ostia.—Two unsexed: 35·7, 36·8.
Sardinia: near Siliqua.—One male: 36·7; one female: 37·8.
Corsica.—Three males: 37·8, 37·8, 38·0; one female: 37·7.
Balearics.—Four males: 36·2, 36·6, 36·8, 36·9; three females: 36·8, 37·6, 37·6.
Spain: Seville.—One male: 37·7.
Portugal: Cintra.—One male: 36·2.

Morocco: Tangiers.—One female: 37·7.
S.W. Switzerland: St. Cergues.—One male: 37·7.
N. Switzerland: near Baar.—One male: 38·0.

Intermediate individuals (nearest to *minimus*).

S.W. Switzerland: Geneva.—Two males: 38·2, 38·7. (In one of these specimens (no. 6. 2. 6. 3; forearm 38·7) the right elbow is damaged, and I do not feel quite satisfied that the same is not the case with the left elbow.—A third Geneva specimen in the collection, also a male, is slightly immature, but probably full-grown; its forearm measures 38·2.)

Rh. h. hipposiderus.

Gilgit.—One male: 39·8.
N.W. Persia: Urmi.—One male: 39·8.
Armenia: Van.—One male: 39·2; one female: 39·3.
S. Caucasus.—Two males: 39·0, 39·8; one female: 38·7.
[Cyprus.—One female: 39·6 *.]
N. Bulgaria: Rustshuk.—One male: 39·0.
Roumania.—Five males: 39·0, 39·5, 39·8, 40·0, 41·0; eight females: 39·5, 39·8, 40·0, 40·0, 40·0, 41·0, 41·0, 41·2.
Transsilvania: Kronstadt.—Two females: 40·0, 41·0.
S. Carpathians.—One male: 39·3.
Hungary: Offner Mts.—One female: 41·7.
Bavaria: Burgheim.—Two males: 39·0, 40·0; one female: 40·0.
Schlangenbad.—One male: 40·0; one female: 40·0.
N. Switzerland: Thurgau.—One male: 40·2; three females: 40·0, 40·6, 41·7.
S.W. Switzerland: St. Maurice.—One unsexed: 41·3.

The above details may be summed up in tabular form as follows:—

	Specimens examined.	Min.	Max.	Average.
		mm.	mm.	mm.
minimus, males	24	34·7	38·0	36·7
hipposiderus, males	16	39·0	41·0	39·7
minimus, females	15	36·0	37·8	37·0
hipposiderus, females	19	38·7	41·7	40·3
minimus, all examples†	43	34·7	38·0	36·7
hipposiderus, all examples†	36	38·7	41·7	40·0

* On this specimen, see Proc. Zool. Soc. 1905, ii. p. 142, footnote ‡.
† Including also the few unsexed specimens enumerated above.

These figures need no comment. It is a well-known fact that in many bats females average a trifle larger than males, but so small is the average difference in size between the sexes of this species (0·3 mm. in *minimus* in favour of the females, 0·6 mm. in *hipposiderus* in favour of the same sex) that it is scarcely detectable except on careful measuring of a tolerably large series.

As already emphasized in my paper two years ago, there are certain border districts in which the two races meet and, to a certain extent, merge into one another. As yet we know exceedingly little about the exact limits of this transitional zone, but the detailed lists of specimens examined and measured, as given above, may, perhaps, throw a little light on the question. It will be noted that of the five full-grown specimens I have seen from S.W. Switzerland (St. Maurice, St. Cergues, and Geneva), one is indistinguishable from *minimus*, one decidedly a *hipposiderus*, whereas three (all from Geneva) are rather intermediate but nearest to *minimus*; of the five full-grown specimens from N. Switzerland (Baar, Thurgau), one is indistinguishable from *minimus* though having the maximum size of this form, whereas four are decidedly *hipposiderus*; the series is much too small to allow of any safe conclusions, but, so far as it goes, it shows that in S.W. Switzerland both forms occur as well as intermediate examples, in N. Switzerland *hipposiderus*, as might be expected, is the dominant form (four of five examples), whereas a small percentage (one of five) is referable to *minimus*. Although, as already said, derived from a very small series of specimens, this result will probably prove to be approximately correct, and it is so far from being unexpected that it is, on the contrary, entirely in accordance with what I could predict without hesitation two years ago. —To this I can now add one fact more: not only does *minimus* go a certain distance northward into the area of *hipposiderus*, becoming probably rarer the farther north, but I know on excellent authority* that *hipposiderus* goes a

* Dr. Senna, Florence, writes (translation from letter, Dec. 19, 1905):— "You have pointed out that *hipposiderus* ranges (so far as our continent is concerned) over Central Europe N. of the Balkans and the Alps, *minimus* over the Mediterranean Subregion. This seems to be perfectly true, generally speaking; I find, for instance, that nine specimens from Cyprus are decidedly *minimus*, several examples from S. Italy (Calabria, Sicily) are, without exception, *minimus*; but *in middle and northern Italy we begin to meet with hipposiderus*, about 15 per cent. of the individuals belonging to this form, as against 85 per cent. of *minimus*; still farther north, as you say, we find *hipposiderus*. . . . . I hope I shall get so much spare time that I can work out the range of these forms in Italy on the basis of the collections preserved in all, or most, of the Italian Museums."

certain distance southward into the area in which *minimus* is the dominant form. But all this is precisely what we must expect, in view of the fact that these races do not occupy isolated (insular) localities, but the central and southern part of one continuous land area.—Very likely there is also in W. Asia a certain region in which both forms or intermediate examples occur (see the female from S. Caucasus, which I have referred to *hipposiderus*, but which has the minimum size of this race).

From France and the whole of the Balkan Peninsula S. of Rustshuk we completely lack information; it would be particularly interesting to know whether French specimens are *hipposiderus* or *minimus*, or, possibly, identical with the British form, *minutus*.

I should not have taken the trouble to give the proofs—once more, and in a much more detailed form—of the existence in continental Europe of two well-marked races of the Lesser Horseshoe Bat were it not for the following reason :—It is a matter of course that on the basis of the collection in one single Museum—be such collection even so rich as that of the British Museum—it is impossible to give more than a rough sketch of the range of these two races of *Rh. hipposiderus*; the working out of the details must be left to the local naturalists interested in the subject. But the stimulus to do such useful work is naturally taken away, or greatly weakened, when a writer, claiming to base his conclusion on a careful examination of an unusually large series of specimens, declares that he cannot see that the supposed racial difference is anything but a difference between male and female of the same species. To show that this opinion is entirely wrong is the object of these lines. Naturalists may safely take it as an established fact that these two races do exist; what we want to know now is, (1) the exact area occupied *exclusively* by the one or the other form, and (2) the area where both of them *occur together*. This latter is the transitional zone between the regions inhabited by the two races.

L.—*Some new European Insectivora and Carnivora.*

By Gerrit S. Miller.

In the course of some studies of the European mammal fauna, undertaken at the invitation of Mr. Oldfield Thomas, I have found the following hitherto unnamed Insectivora and Carnivora.